

C.) REMARKS

This Response is filed in response to the Office Action dated March 16, 2006.

Upon entry of this Response, claims 1-16 and 23 will be pending in the Application.

In the outstanding Final Office Action, the Examiner rejected claims 20, and 22 under 35 U.S.C. 102(b) as being anticipated by Doeber et al. (U.S. Patent No. 5,511,106); rejected claims 1, 4-11 and 16 under 35 U.S.C. § 103(a) as being unpatentable over Zeller et al. (U.S. Patent No. 6,055,292) in view of Mori et al. (U.S. Patent No. 5,506,879); rejected claims 14 and 15 under 35 U.S.C. § 103(a) as being unpatentable over Zeller et al. (U.S. Patent No. 6,055,292) and Mori et al. (U.S. Patent No. 5,506,879) in further view of Doeber et al. (U.S. Patent No. 5,511,106); rejected claims 12 and 13 under 35 U.S.C. § 103(a) as being unpatentable over Zeller et al. (U.S. Patent No. 6,055,292), Mori et al. (U.S. Patent No. 5,506,879) and Doeber et al. (U.S. Patent No. 5,511,106) in further view of Fairleigh (U.S. Patent No. 5,997,176); rejected claims 18 and 21 under 35 U.S.C. § 103(a) as being unpatentable over Doeber et al. (U.S. Patent No. 5,511,106) in view of Kopsala (U.S. Patent No. 6,731,717); objected to claims 2 and 3; and allowed claim 23.

REJECTION UNDER 35 U.S.C. 102

The Examiner rejected claims 20 and 22 under 35 U.S.C. 102(b) as being anticipated by Doeber et al. (U.S. Patent No. 5,511,106), hereinafter referred to as "Doeber."

Applicants respectfully traverse the rejection of claims 20 and 22 under 35 U.S.C. 102(b).

Claims 20 and 22 have been cancelled herein thereby rendering the rejection thereagainst moot. Thus, Applicant hereby requests the withdrawal of the rejection of claims 20 and 22.

REJECTION UNDER 35 U.S.C. 103

A. Rejection of claims 1, 4-11, and 16

The Examiner rejected claims 1, 4-11 and 16 under 35 U.S.C. § 103(a) as being unpatentable over Zeller et al. (U.S. Patent No. 6,055,292), hereinafter referred to as "Zeller" in view of Mori et al. (U.S. Patent No. 5,506,879), hereinafter referred to as "Mori."

Specifically, the Examiner stated that

7. Regarding claims 1, 4, 11 and 16, Zeller teaches a dental x-ray diagnostic apparatus for performing real-time digital radiography in Cephalography of a patient skull and method for operating a dental diagnostic apparatus performing same, comprising: a base frame arrangement (Figure 7); a rotary frame ("Rotary Unit") coupled to the base frame arrangement, the rotary frame supporting an x-ray source (3); a cinematic unit connecting the rotary frame and the base frame arrangement, the said cinematic unit being configured to execute movements of the rotary frame (Column 5, lines 3-18) controlled by data supplied from a microcomputer (12); an x-ray imager (18, 18') disposed in a Cephalographic position, the x-ray imager being movable during a scanning operation by an independent actuator (9); and wherein the movements of the cinematic unit permit the rotary frame to permit illumination of the patient skull by the x-ray source. Zeller also teaches image acquisition of image data by the x-ray imager and digital processing of the image data for reconstruction of a diagnostic image (Column 4, lines 27-31; Column 7, lines 42-65).
8. Zeller does not teach a cinematic unit that executes roto-translational movements of the rotary frame, wherein the roto-translational movements comprise one rotation movement and two transverse linear movements in a horizontal plane, and the roto-translational movements of the rotary frame being driven by independent actuators in the cinematic unit and wherein the roto-translational movements of the cinematic unit permit the rotary frame to perform a roto-translating scanning trajectory to permit illumination of the patient skull by the x-ray source from a predefined virtual center of irradiation located at the focal point of the x-ray source. Zeller does not specifically teach an automatic computer controlled mechanism providing relocation of the x-ray imager selectively between a Cephalographic and a Panoramic position
9. Mori teaches Cephalographic imaging where a cinematic unit that executes roto-translational movements of the rotary frame, wherein the roto-translational movements comprise one rotation movement and two transverse linear movements in a horizontal plane, and the roto-translational movements of the rotary frame being driven by

independent actuators (2a, 2c and 3a) in the cinematic unit. The actuators allow a supporting arm of the rotary frame to be aligned with respect to a Cephalographic plane (Column 5, lines 54-67). The actuators also cooperate for roto-translational movements of the cinematic unit to permit the rotary frame to perform a roto-translating scanning trajectory to permit illumination of the patient skull by the x-ray source from a predefined virtual center of irradiation located at the focal point of the x-ray source (Figure 6 and Column 7). The actuators allow the parts of the machine to geometrically align to ensure the x-rays emitted from the source always irradiate to the receiver (Column 7). An automatic computer (12) controlled mechanism provides relocation of the x-ray imager selectively between a Cephalographic and a Panoramic position (Column 3, lines 19-23 and Column 5, lines 36-53) so that dental clinics can selectively photograph specific regions of a patient (Column 1, lines 12-23).

10. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the three independent actuators of Mori in the method and apparatus of Zeller in order to allow a supporting arm of the rotary frame to be aligned with respect to a Cephalographic plane (Mori, Column 5, lines 54-67) and to permit the rotary frame to perform a roto-translating scanning trajectory to permit illumination of the patient skull by the x-ray source from a predefined virtual center of irradiation located at the focal point of the x-ray source so that the x-rays are always irradiated to the receiver (Mori, Figure 6 and Column 7). It would have been further obvious to provide an automatic computer controlled mechanism to provide relocation of the x-ray imager selectively between a Cephalographic and a Panoramic position (Mori, Column 3, lines 19-23) so that dental clinics can selectively photograph specific regions of a patient (Mori, Column 1, lines 12-23).

Applicants respectfully traverse the rejection of claims 1, 4-11, and 16 under 35 U.S.C. § 103(a).

Zeller, as understood, is directed to a dental X-ray diagnostic apparatus for producing panorama tomograms. The apparatus contains a height-adjustable carrying column at which a rotary unit is held. The rotary unit carries an X-ray source and an X-ray detector camera that are

diametrically opposite. A head retainer and positioning arrangement are also provided. The camera is composed of an oblong housing having a slot formed in its side facing toward the X-ray source. A detector arrangement having one or more radiation-sensitive detectors, for example in the form of CCD sensors, is located inside the camera behind the slot. The detector arrangement is held inside the detector camera so as to be adjustable in the direction of its longitudinal axis. A diaphragm system, which contains the primary diaphragm, is held so as to be synchronously adjustable relative to the detector camera. The detector elements arranged inside the detector camera can be adjusted along the principal detector axis with a suitable adjustment mechanism, such as with a stepping motor and a spindle. Via a serial interface, the stepping motor communicates with control electronics of the apparatus. Via a further interface, the control electronics forwards control commands to an actuating drive arranged at the X-ray source. The synchronous adjustment of a primary diaphragm of the diaphragm system ensues with this actuating drive.

Mori is directed to an X-ray apparatus for photographing planigraphic planes. The planigraphic X-ray apparatus includes a rotation mechanism for rotating a support member so that an X-ray generator and an X-ray detection surface, both being supported by the support member, can be rotated around a subject. A position adjustment mechanism is used for setting the position of the rotation center of the support member rotated by the rotation mechanism. A linear movement means is used for moving the support member in parallel with the planigraphic plane selected to be photographed inside the subject. An X-ray detection surface drive means is used for driving the X-ray detection surface in the direction opposite to the movement of the linear movement means and in synchronization with the movement thereof. An X-ray generator rotation means is used for rotating the X-ray generator toward the X-ray detection surface in synchronization with the movement of the linear movement means. In addition, to photograph rotational tomographic planes, the support member is rotated using the rotation mechanism to rotate the X-ray generator and the X-ray detection surface without activating the linear movement means for moving the support member and the X-ray generator rotation means for rotating the X-ray generator.

In contrast, independent claim 1 recites a dental x-ray diagnostic apparatus for performing real-time digital radiography in Cephalography of a patient skull, the apparatus comprising: a base frame arrangement; a rotary frame coupled to the base frame arrangement, the rotary frame supporting an x-ray source; a cinematic unit connecting the rotary frame and the base frame arrangement, the cinematic unit being configured to execute roto-translational movements of the rotary frame, wherein the roto-translational movements comprise one rotation movement and two transverse linear movements in a horizontal plane, and the roto-translational movements of the rotary frame being driven by independent actuators in the cinematic unit controlled by data supplied from a microcomputer; an x-ray imager disposed in a Cephalographic position, the x-ray imager being movable during a scanning operation by an independent actuator; and wherein the roto-translational movements of the cinematic unit permit the rotary frame to perform a roto-translating scanning trajectory to permit illumination of the patient skull by the x-ray source from a predefined virtual center of irradiation.

Independent claim 16 recites a method for operating a dental x-ray diagnostic apparatus performing real-time digital radiography in Cephalography, comprising the steps of: positioning a patient by a patient positioning system; irradiating a patient skull from a predefined virtual center of irradiation of an x-ray source during a roto-translational movement of a rotary frame supporting the x-ray source and a linear movement of an x-ray imager positioned in a Cephalographic position; performing acquisition of image data by the x-ray imager and digital processing of the image data for reconstruction of a diagnostic image; and wherein the roto-translational movements of the rotary frame include one rotational movement and two transverse linear movements in a horizontal plane, and the roto-translational movements of the rotary frame being driven by independent actuators in the cinematic unit controlled by data supplied from a microcomputer.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). “All words in a claim must be considered in judging the patentability of that claim against the prior art.” *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

See Manual of Patent Examining Procedure, 8th Edition, Revision 4 (MPEP), Section 2143.03.

Several of the features recited by Applicant in independent claims 1 and 16 are not taught or suggested by Zeller or Mori. First, Zeller and/or Mori do not teach or suggest an x-ray imager positioned (or disposed) in a Cephalographic position as recited by Applicant in independent claims 1 and 16. Zeller and Mori are both x-ray apparatuses configured for panoramic operations and not for a cephalographic operation and, as such, cannot teach or suggest an x-ray imager disposed in a Cephalographic position as recited in independent claims 1 and 16. Specifically, Zeller is configured for producing panorama tomograms (*See* Zeller, col. 2, lines 43-46) and Mori is configured to provide both planigraphic photographs and rotational tomographic photographing (*See* Mori, col. 3, lines 19-23). The Examiner asserts that both Zeller and Mori teach cephalographic operations. *See* Office Action, pages 2-3. However, the Examiner's assertion of Zeller and Mori as teaching cephalographic techniques is incorrect and not supported by the references. The panorama tomogram of Zeller (and the rotational tomogram of Mori) are both tomographic techniques, i.e., slicing techniques, not cephalographic techniques and would not be understood by one skilled in the art as being the same. Tomographic operations involve a scanning operation where there is an extraction of the plane in focus, i.e., slicing. In contrast, cephalographic operations involve a scanning operation with the overlapping of layers together. Furthermore, the planigraphic photograph of Mori corresponds to a linear tomographic technique (both of which are tomographic techniques) and not to a cephalographic technique as asserted by the Examiner. In addition, cephalographic imaging has a much larger SID, i.e., the distance between the focal point and the imager, than is used in panoramic operations and disclosed in Zeller and Mori.

Furthermore, the Examiner has already acknowledged that the Zeller and Mori are not directed to cephalographic techniques on pages 7-8 of the Office Action. Specifically, the Examiner states "Zeller and Mori teach a computer tomography apparatus ... Zeller and Mori fail to expressly incorporate the Cephalographic features of the device ... Therefore, it would have been obvious to one of ordinary skill in the art ... to include a Cephalographic function in the panoramic and transversal device of Zeller and Mori." Thus, Applicant submits that since Zeller and Mori teach or suggest only panoramic techniques and devices, they cannot teach or suggest

an x-ray imager positioned in a Cephalographic position as recited in claims 1 and 16. The Examiner is requested to identify where in Zeller and Mori a cephalographic position (and not a panoramic position) of the x-ray imager is taught or suggested.

Next, Zeller and/or Mori do not teach or suggest roto-translational movements of the rotary frame, wherein the roto-translational movements comprise one rotation movement and two transverse linear movements in a horizontal plane as recited by Applicant in independent claims 1 and 16. The Examiner acknowledges that Zeller does not teach or suggest roto-translational movements, but asserts that Mori teaches a cinematic unit that can execute roto-translational movements. Again, the Examiner's assertion is incorrect and not supported by the reference. The Examiner asserts that the roto-translational movements are performed by actuators 2a, 2c and 3a in Mori. However, a close review of Mori reveals that actuators 2a and 2c are motors used for positioning the rotation center of the support member. *See Mori*, col. 3, lines 56-62 and col. 4, lines 9-16. The actuators 2a and 2c identified by the Examiner are only used for positioning prior to the tomographic processes and are not used during the tomographic processes. *See Mori*, col. 5, line 54 to col. 6 line 15 and col. 6, lines 45-62. Thus, Applicant submits that Mori does not teach or suggest a roto-translational movements of the rotary frame, wherein the roto-translational movements comprise one rotation movement and two transverse linear movements in a horizontal plane as recited in independent claims 1 and 16. At best, Mori teaches a rotational movement and one linear movement in a horizontal plane from the linear slide mechanism. Furthermore, the inclusion of the linear slide mechanism in Mori, confirms Applicant's discussion of the actuators 2a and 2c because if the actuators 2a and 2c were capable of the movements asserted by the Examiner, the operation of the linear slide mechanism would appear to be unnecessary and redundant because that movement could have been handled by one of the actuators.

"A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984)." *See* MPEP, Section 2141.02. In this case Mori clearly does not teach or suggest roto-translational movements of the rotary frame, wherein the roto-translational movements comprise

one rotation movement and two transverse linear movements in a horizontal plane. Thus, Applicant submits that since Zeller and Mori teach or suggest only limited movements of the rotary frame, they cannot teach or suggest roto-translational movements of the rotary frame, wherein the roto-translational movements comprise one rotation movement and two transverse linear movements in a horizontal plane as recited in claims 1 and 16.

Further, Zeller and/or Mori do not teach or suggest the rotary frame to perform a roto-translating scanning trajectory to permit illumination of the patient skull by the x-ray source from a predefined virtual center of irradiation or irradiating a patient skull from a predefined virtual center of irradiation of an x-ray source during a roto-translational movement of a rotary frame as recited by Applicant in independent claims 1 and 16. The Examiner acknowledges that Zeller does not teach or suggest irradiating a patient skull from a predefined virtual center of irradiation of an x-ray source, but asserts that Mori teaches irradiating a patient skull from a predefined virtual center of irradiation of an x-ray source. Yet again, the Examiner's assertion is incorrect and not supported by the reference. The Examiner asserts that irradiating a patient skull from a predefined virtual center of irradiation of an x-ray source is disclosed in Figure 6 and column 7 of Mori. However, a close review of Mori reveals that the passage and Figure identified by the Examiner do not discuss any virtual center of irradiation of the x-ray source during an imaging process, but in fact only discusses the particular configuration of components prior to the imaging process. Applicant is not able to locate any discussion in Mori regarding the location of the focal point during the imaging process except in Figure 5, which shows the focal point linearly moving from one position to another and clearly would not be a virtual center of irradiation as recited in independent claims 1 and 16. Thus, Applicant submits that Mori does not teach or suggest irradiating a patient skull from a predefined virtual center of irradiation of an x-ray source during a roto-translational movement of a rotary frame or the rotary frame to perform a roto-translating scanning trajectory to permit illumination of the patient skull by the x-ray source from a predefined virtual center of irradiation as recited in independent claims 1 and 16.

Dependent claims 4-11 are believed to be allowable as depending from what is believed to be an allowable independent claim 1 for the reasons given above. In addition, claims 4-11

recite further limitations that distinguish over the applied art. In conclusion, it is respectfully submitted that claims 1, 4-11 and 16 are not anticipated nor rendered obvious by Zeller and Mori and are therefore allowable.

B. Rejection of claims 14 and 15

The Examiner rejected claims 14 and 15 under 35 U.S.C. § 103(a) as being unpatentable over Zeller and Mori in further view of Doeber.

Applicants respectfully traverse the rejection of claims 14 and 15 under 35 U.S.C. § 103(a).

Zeller is directed a dental x-ray diagnostic apparatus as discussed in greater detail above.

Mori is directed to an x-ray apparatus for photographing planigraphic planes as discussed in greater detail above.

Doeber is directed to an x-ray diagnostics installation.

Applicant submits that dependent claims 14 and 15 are distinguishable from Zeller, Mori and/or Doeber for at least the following reasons. To begin, dependent claims 14 and 15 are believed to be distinguishable from Zeller, Mori and/or Doeber as depending from what is believed to be an allowable independent claim 1 as discussed above. Furthermore, there is nothing in Doeber that teaches or suggests any of the limitations in independent claim 1 not taught or suggested by Zeller and Mori.

In conclusion, it is respectfully submitted that claims 14 and 15 are not anticipated nor rendered obvious by Zeller, Mori and/or Doeber and are therefore allowable.

C. Rejection of claims 12 and 13

The Examiner rejected claims 12 and 13 under 35 U.S.C. § 103(a) as being unpatentable over Zeller, Mori and Doeber in further view of Fairleigh (U.S. Patent No. 5,997,176), hereafter referred to as "Fairleigh."

Applicants respectfully traverse the rejection of claims 12 and 13 under 35 U.S.C. § 103(a).

Zeller is directed a dental x-ray diagnostic apparatus as discussed in greater detail above.

Mori is directed to an x-ray apparatus for photographing planigraphic planes as discussed in greater detail above.

Doebert is directed to an x-ray diagnostics installation.

Fairleigh, as understood, is directed to an x-ray apparatus for producing a standard set of x-rays of a person's head while she is in a prone position.

Applicant submits that dependent claims 12 and 13 are distinguishable from Zeller, Mori, Doeber and/or Fairleigh for at least the following reasons. To begin, dependent claims 12 and 13 are believed to be distinguishable from Zeller, Mori, Doeber and/or Fairleigh as depending from what is believed to be an allowable independent claim 1 as discussed above. Furthermore, there is nothing in Fairleigh that teaches or suggests any of the limitations in independent claim 1 not taught or suggested by Zeller, Mori and/or Doeber.

In conclusion, it is respectfully submitted that claims 12 and 13 are not anticipated nor rendered obvious by Zeller, Mori, Doeber and/or Fairleigh and are therefore allowable.

D. Rejection of claims 18 and 21

The Examiner rejected claims 18 and 21 under 35 U.S.C. § 103(a) as being unpatentable over Doeber in view of Kopsala (U.S. Patent No. 6,731,717), hereafter referred to as "Kopsala."

Applicants respectfully traverse the rejection of claims 18 and 21 under 35 U.S.C. § 103(a).

Claims 18 and 21 have been cancelled herein thereby rendering the rejection thereagainst moot. Thus, Applicant hereby requests the withdrawal of the rejection of claims 18 and 21.

Information Disclosure Statement

In the outstanding Office Action, the Examiner attached an Information Disclosure Statement (PTO/SB/08) submitted by Applicant on September 16, 2005 (and received by the USPTO on September 19, 2005). On the Information Disclosure Statement, the Examiner initialed the listed Foreign Patent and Non-Patent Literature Documents as being considered by the Examiner, but did not initial or acknowledge the listed U.S. Patent Documents as being considered by the Examiner. Applicant requests that the Examiner confirm that the listed U.S. Patents have been considered by the Examiner and provide Applicant with a copy of the Information Disclosure Statement with the listed U.S. Patents initialed by the Examiner as being considered. If the listed U.S. Patents have not been considered by the Examiner, Applicant

requests that the Examiner consider the references and provide Applicant with a copy of the Information Disclosure Citation with the listed U.S. Patents initialed by the Examiner.

Allowable Subject Matter

The Examiner indicated that claim 23 is allowed. The Examiner further objected to claims 2 and 3 as being dependent upon a rejected base claim, but indicated that the claims would be allowable, if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant appreciates the Examiner's indication of allowable subject matter, but believes that all of the claims are allowable for the reasons given above.

CONCLUSION

In view of the above, Applicant respectfully requests reconsideration of the Application and withdrawal of the outstanding objections and rejections. As a result of the amendments and remarks presented herein, Applicant respectfully submits that claims 1-16 and 23 are not anticipated by nor rendered obvious by Zeller, Mori, Doeber, Fairleigh, Kopsala or their combination and thus, are in condition for allowance. As the claims are not anticipated by nor rendered obvious in view of the applied art, Applicant requests allowance of claims 1-16 and 23 in a timely manner. If the Examiner believes that prosecution of this Application could be expedited by a telephone conference, the Examiner is encouraged to contact the Applicant.

The Commissioner is hereby authorized to charge any additional fees and credit any overpayments to Deposit Account No. 50-1059.

Respectfully submitted,
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